

Point Cloud Generation using Transformer Encoders and Normalising Flows

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Machine-learning-based data generation has become a major topic in particle physics, as the current Monte Carlo simulation approach is computationally challenging for future colliders, which will have a significantly higher luminosity. The generation of particles poses difficult problems similar as is the case for point clouds. We propose that a transformer setup is well fitted to this task. In this study, a novel refinement model is presented, which uses normalizing flows as a prior and then enhances the generated points using an adversarial setup with two Transformer encoder networks. Different training architectures and procedures were tested and compared on the jetnet datasets.

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